STEPS TO RUN THE CODE

Before getting started: Upload the HAM10000.zip file and the HAM10000_metadata.csv file to Google Drive, to the same mail where you use Google Colab.

All the experiments were carried out in Google Colab.

1) RegNetY032

Filename: **ProjectCode_1_RegNetY032.ipynb**

- **Run the cells in sequential manner, one-by-one, without changing the order of execution of the cells.**
- Initially, libraries are loaded and the dataset is organized into folders.
- Then, the data is split into train, validation and test, and the train data is augmented.
- Then the augmented dataset is used to train the RegNetY032 model.
- After training, model weights **regnety032.hdf5** will be saved to your Google Drive.
- Then these weights are loaded onto the network for testing the model and performance evaluation of the model.

2) Reg-SA-Net

Filename: **ProjectCode_2_RegSANet.ipynb**

- **Run the cells in sequential manner, one-by-one, without changing the order of execution of the cells.**
- Initially, libraries are loaded and the dataset is organized into folders.

- Then, the data is split into train, validation and test, and the train data is augmented.
- Then the augmented dataset is used to train the RegSANet model.
- After training, model weights **regsanet.hdf5** will be saved to your Google Drive.
- Then these weights are loaded onto the network for testing the model and performance evaluation of the model.

3) Hyperparameter tuning using Harris-Hawks Optimization

Harris-Hawks Optimization was implemented in AWS Sagemaker Notebook Instance, since Google Colab Session crashes while implementing optimization algorithm.

Instance type: ml.g5.xlarge

Filename: **ProjectCode_3_HHO_Optimization.ipynb**

- Log in to the AWS Management Console, and head on to the Amazon Sagemaker Service.
- In the sidebar, click on notebook instances, and create a new instance, with instance type as **ml.g5.xlarge**.
- Once the instance is created, click **Open Jupyter**, and upload the HAM10000.zip file and HAM10000_metadata.csv file.
- Then upload the **ProjectCode_3_HHO_Optimization.ipynb** notebook, and run the cells one-by-one.
- At the last cell, the optimal hyperparameters are returned by the HHO Algorithm.

4) HHO-Reg-SA-Net

Filename: **ProjectCode_4_HHORegSANet.ipynb**

- **Run the cells in sequential manner, one-by-one, without changing the order of execution of the cells.**
- Initially, libraries are loaded and the dataset is organized into folders.

- Then, the data is split into train, validation and test, and the train data is augmented.
- Then the augmented dataset is used to train the HHO-RegSANet model.
- The optimal hyperparameters returned by the HHO Algorithm are used to train the HHO-RegSANet model.
- After training, model weights **hhoregsanet.hdf5** will be saved to your Google Drive.
- Then these weights are loaded onto the network for testing the model and performance evaluation of the model.

5) Visualization of Attention Maps

Filename: **ProjectCode5_Attention_Map.ipynb**

- **Run the cells in sequential manner, one-by-one, without changing the order of execution of the cells.**
- Create a folder ***HAM10000amaptest*** in Google Drive, and upload the test images to this folder.
- Run the ***Attention Map Generation*** cell to generate the set of Attenion Maps.
- Testing for a single image can also be done, by uploading the image to the current Google Colab session, and running the ***Test for single image*** cell.